Developing Partnerships with Industry

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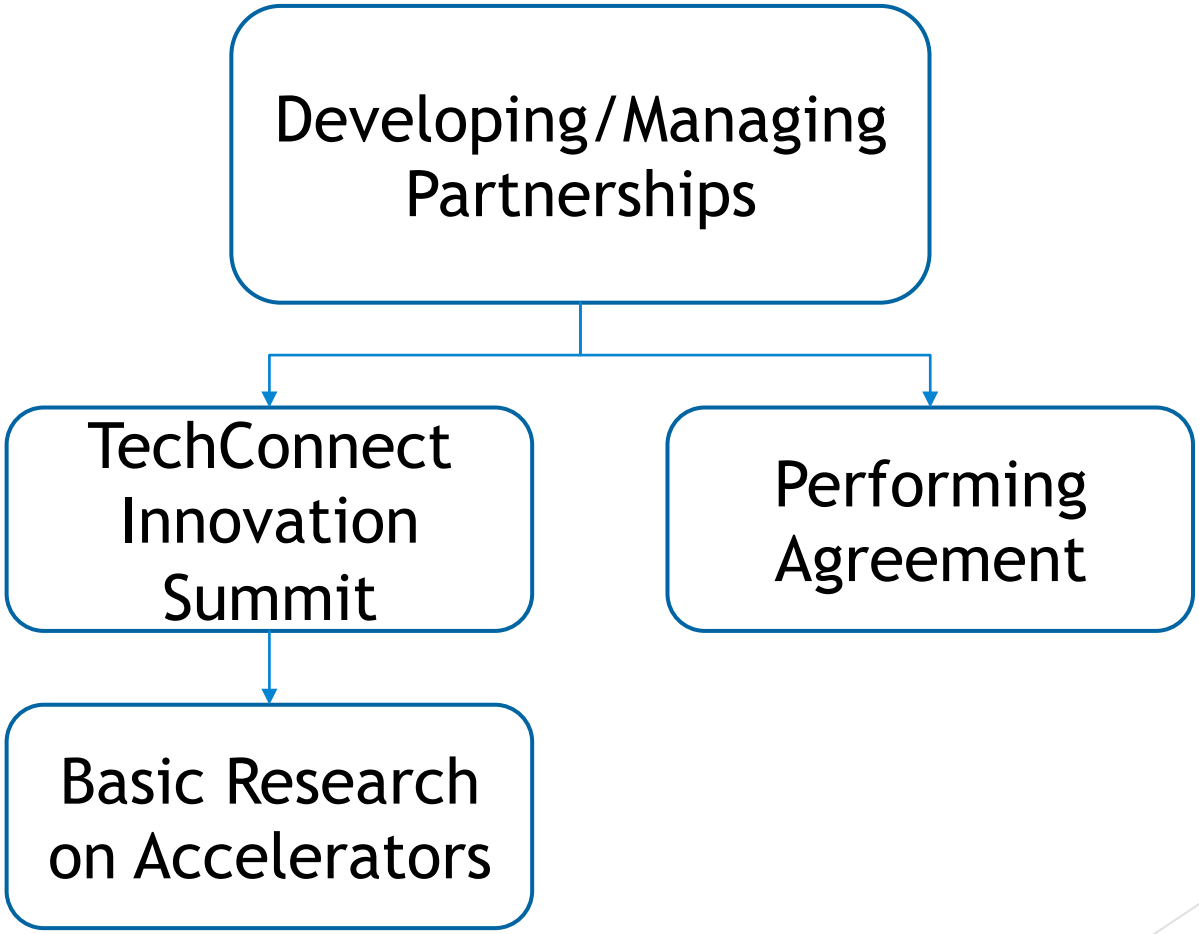
Under the supervision of Cherri Schmidt

Directorate/ Office of Partnerships and Technology Transfer

Fermilab

Overview of Project



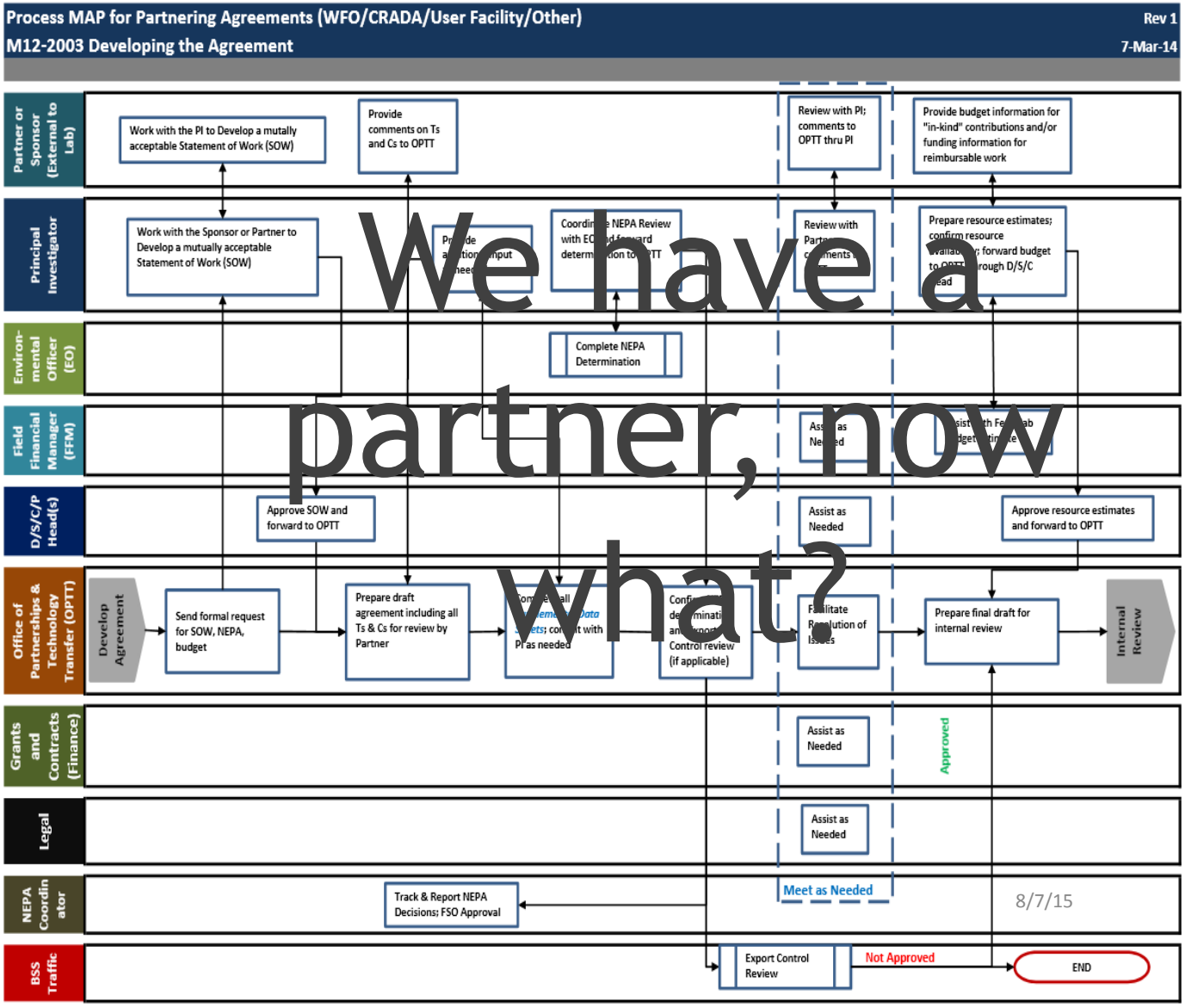
Office of Partnerships and Technology Transfer (OPTT)

- Responsible for:
  - Handling Intellectual Property
    - License technology
  - Developing agreements with industry, universities, and other institutions outside of the Department of Energy (DOE)

Performing Agreements

- Various kinds of agreements:
  - Strategic Partnership Project (SPP)
  - User Agreements
  - Cooperative Research and Development Agreement (CRADA)
- CRADA with MuPlus Inc.
  - “Pressurized Gas Beam Monitor for Extremely High Intensities”
  - Design and simulation of a prototype RF resonator

Performing Agreements

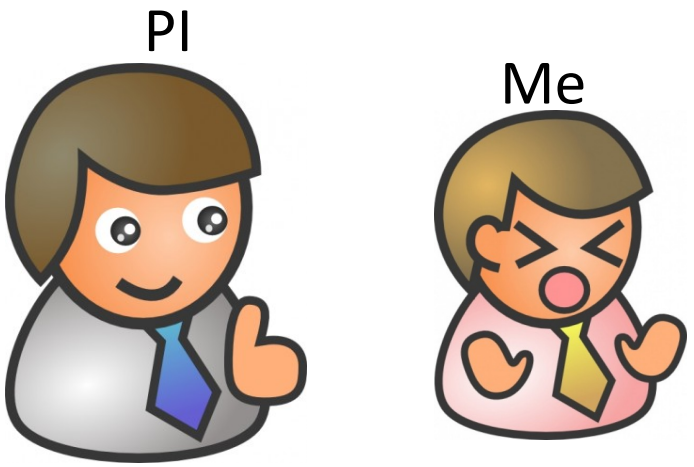


We have a partner, now what?

External Partner
Principal Investigator
Environmental Officer
Legal
Field Financial Manager
Division Head
OPTT

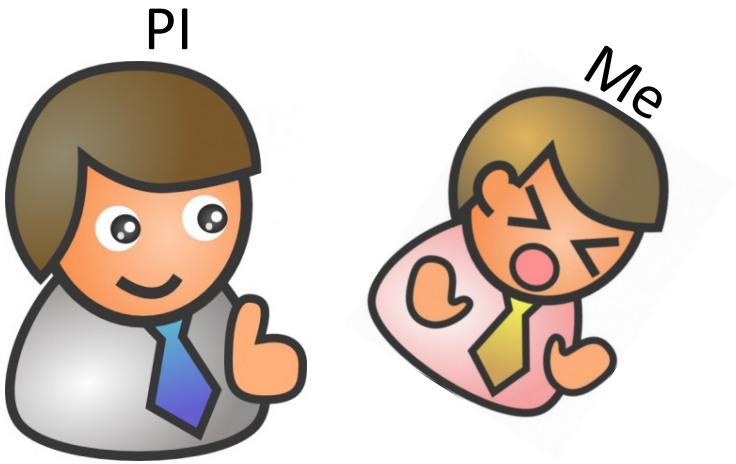
Performing Agreements – CRADA

- 3 Main components to every agreement
  - Statement of Work
    - Scope, Approach, Schedule, Deliverables
  - Terms and Conditions
  - Supplemental Information that must be submitted to DOE



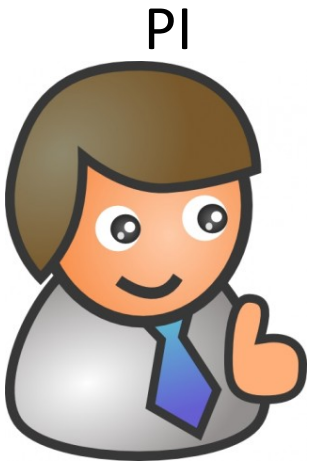
Performing Agreements – CRADA

- Make sure there is no conflict of interests by individuals assigned to the project
- National Environmental Policy Act (NEPA) determination
- Export Control Determination
  - Will equipment, information, technology, or data exported or provided to a foreign national in the U.S?



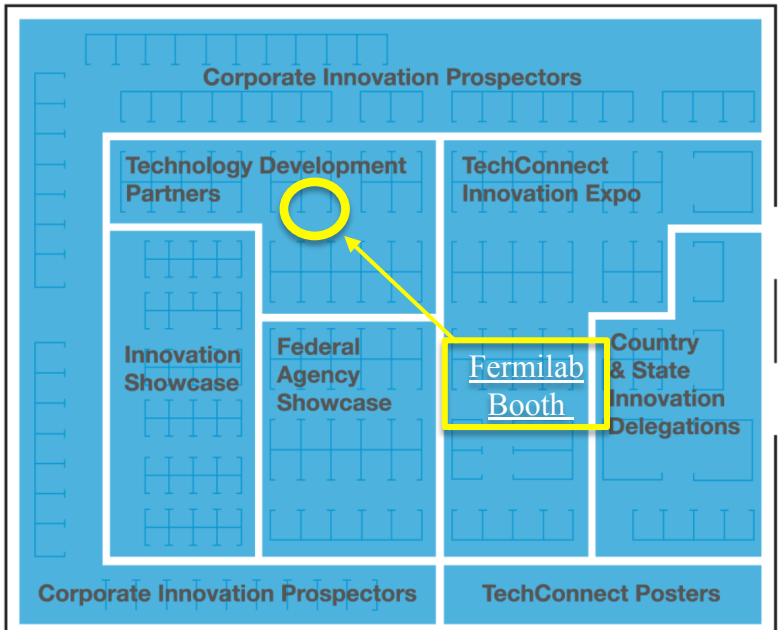
Performing Agreements – CRADA

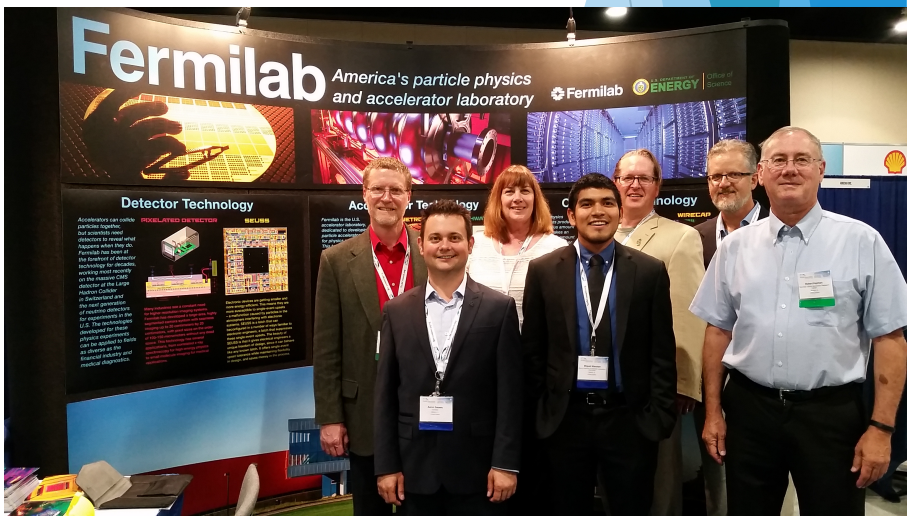
- Checklist
- Prepare all the documents for Internal Review
- Agreement is sent to DOE for approval



TechConnect Innovation Summit

- Participants came together to showcase their available technologies and in search of partnerships
- Showcased 6 Fermilab patent-pending technologies
- Attended workshops on emerging technologies
- More than 40 connections made with institutions and companies





TechConnect Innovation Summit – Electron Beam Accelerators

- Hot lead from a well-known running shoe manufacturer
- What can Fermilab offer?
- My job was to do a short study on the use of electron beam accelerators in industry

TechConnect Innovation Summit – Electron Beam Accelerators

- Approximately 1700 high-current, industrial electron-beam accelerators being used by industry
- Markets for industrial electron beams total $50 billion per year
- The use of these accelerators can be more environmentally friendly and reduce power consumption

ACCELERATORS FOR AMERICA'S FUTURE

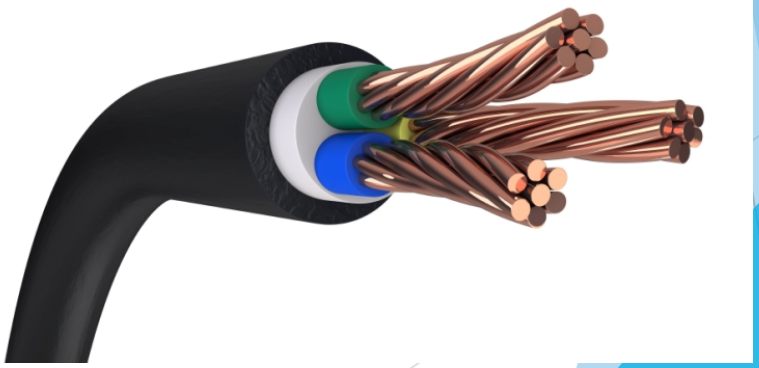
TechConnect Innovation Summit – Electron Beam Accelerators

- In industry, EB accelerators are categorized by their energy range
- Different applications require different beam energies

	Low Energy	Medium Energy	High Energy
Energy Range	70 keV – 300 keV	300 keV – 5 MeV	5 MeV – 10 MeV

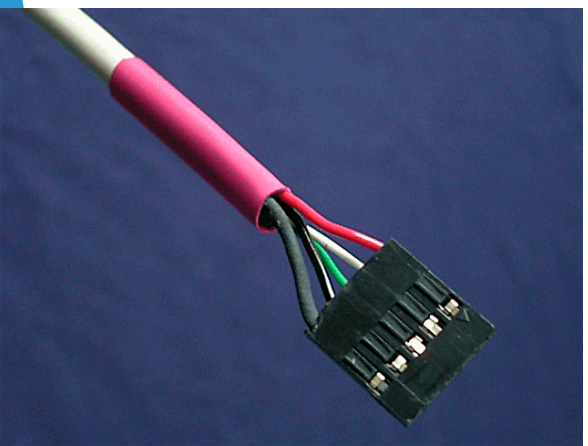
TechConnect Innovation Summit – Electron Beam Accelerators

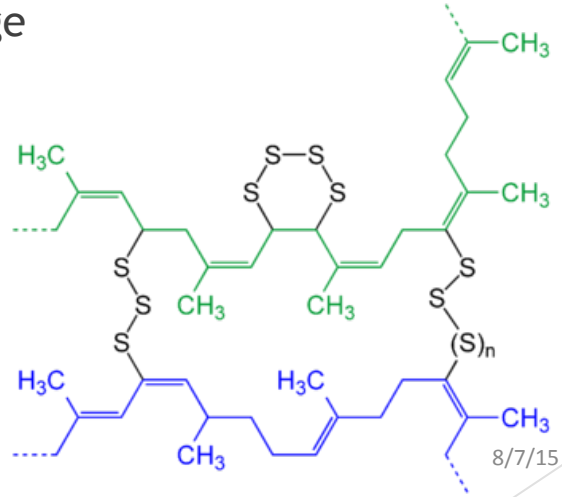
Market Segment	Electron Energy	Maximum penetration
Surface Curing	80-300 keV	0.4 mm
Shrink Film	300-800 keV	1.6 mm
Wire and Cable	0.4-3 MeV	11 mm
Sterilization	3-10 MeV	40 mm



TechConnect Innovation Summit – Cross-Linking Polymers

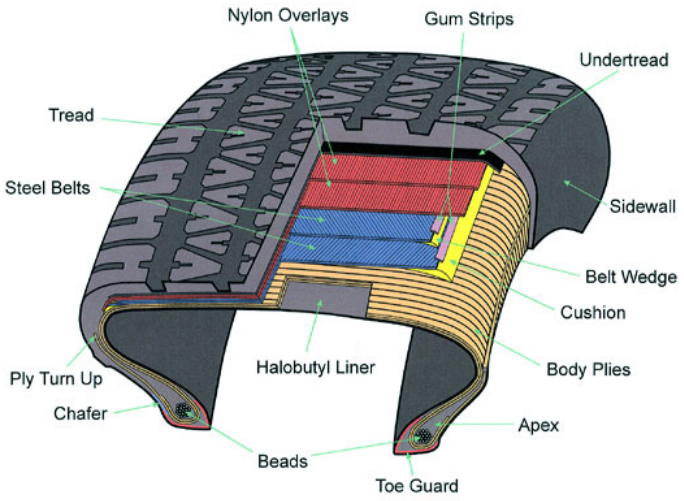
- Cross-Link - bond that links one polymer chain to another. They can be covalent bonds or ionic bonds
- Advantages
  - Can be done at room temperature
  - No use of catalysts or cross-linking agents
  - Reduced energy usage



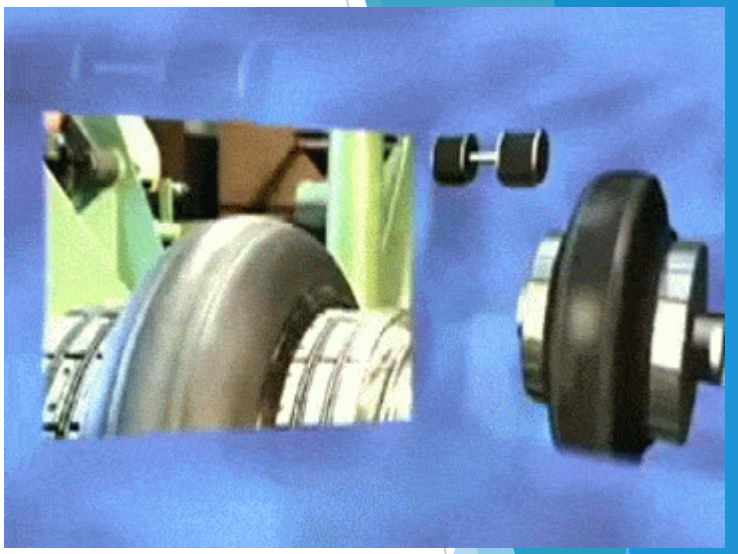


TechConnect Innovation Summit – Radial Tires

- Michelin developed their first radial tire in 1946
- The technology spread to Europe and Asia in the 1950s and 1960s
- Radial design is the standard for all automotive tires



TechConnect Innovation Summit – Vulcanization of Rubber



- Vulcanization of rubber
  - Cross-linking of rubber
- Advantages
  - Less energy consumption than using heat
  - Helps tire keep its shape
  - maintains the tacky surface condition needed to allow the different layers to stick together

Patented May 2, 1933 1,906,402

BFGoodrich® Tires

EDWIN B. NEWTON, OF AKRON, OHIO, ASSIGNOR TO THE B. F. GOODRICH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

METHOD OF VULCANIZING RUBBER

Conclusion

- Performed a CRADA agreement with industry
- Prepared for and attended the TechConnect Innovation Summit with Fermilab Staff
- Performed short study on electron beam accelerators

Acknowledgements

- SIST Committee
- Cherri Schmidt
- Aaron Sauers
- David Peterson

Questions?